



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/892,893	06/28/2001	Yoshikazu Ibara	010834	1585

23850 7590 02/25/2003

ARMSTRONG, WESTERMAN & HATTORI, LLP  
1725 K STREET, NW  
SUITE 1000  
WASHINGTON, DC 20006

EXAMINER

COLEMAN, WILLIAM D

ART UNIT PAPER NUMBER

2823

DATE MAILED: 02/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/892,893

Applicant(s)

IBARA ET AL.

Examiner

W. David Coleman

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed December 2, 2002 have been fully considered but they are not persuasive.
2. Applicants contend that Wieczorek et al., U.S. Patent 6,207,563 B1 herein known as Wieczorek fails to teach every claim feature. Applicants contend that the independent claims teach the feature of the *repeated removal of residual metal that did not react during heat treatment*.
3. In response to Applicants contention that Wieczorek fails to teach the feature of repeated removal of residual metal that did not react during heat treatment, the reference clearly discloses such a feature. Wieczorek teaches that any unreacted metal remaining after the silicide reaction is removed by wet etching (column 7, lines 7-10).
4. Applicants contend that Wieczorek fails to teach "repeating" step. In other words, in Applicants invention, a silicide film (layer) (4S') is formed a number of times in accordance with such steps.
5. In response to Applicants contention that Wieczorek fails to disclose a "repeating step" process of forming silicide layers at least more than once, please see column 7, lines 63-68 and column 8, lines 1-12. Wieczorek teaches an alternate exemplary process for fabricating the transistor and silicide layer 64. An additional metal layer 70 is deposited and subsequent silicide reaction.

*Claim Rejections - 35 USC § 102*

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

7. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

8. Claims 1-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Wieczorek et al., U.S. Patent 6,207,563.

9. Pertaining to claim 1, see **FIGS. 4-7**, where Wieczorek teaches a method for forming a silicide conductive structure on a semiconductor device, the method comprising:

depositing metal **66** on the surface of a patterned semiconductor film;

heat treating the semiconductor film on which the metal is deposited; removing residual metal that did not react during the heat treating step; and

repeating the depositing step, the heat treating step, and the removing step once or a number of times.

Art Unit: 2823

10. Pertaining to claim 2, Wieczorek teaches the method for manufacturing the semiconductor device according to claim 1, further comprising: heat treating the semiconductor film after the repeating step at a temperature that is higher than that of the heat treating step (column 6, lines 57-59 and column 7, lines 61-62).

11. Pertaining to claim 3, Wieczorek teaches the method for manufacturing the semiconductor device according to claim 2, wherein the patterned semiconductor film is an N-type semiconductor (column 6, line 7).

12. Pertaining to claim 4, Wieczorek teaches a method for manufacturing a semiconductor device, comprising:

forming a conductive portion on a substrate, wherein the conductive portion includes a gate electrode; forming a spacer on a side wall of the gate electrode; depositing metal on the surface of the substrate including the conductive portion; applying silicide on the conductive portion in a self-aligned manner by heat treating the substrate on which the metal is deposited; removing residual metal that did not react during the heat treatment; and repeating the depositing step, the silicide applying step, and the removing step once or a number of times.

13. Pertaining to claim 5, Wieczorek teaches the method for manufacturing the semiconductor device according to claim 4, further comprising:

heat treating the substrate after the repeating step at a temperature that is higher than that of the heat treating

Art Unit: 2823

14. Pertaining to claim 6 Wieczorek teaches the method for manufacturing the semiconductor device according to claim 5, wherein the conductive portion to which silicide is applied is an N-type semiconductor.

15. Pertaining to claim 7, Wieczorek teaches the method for manufacturing the semiconductor device according to claim 4, wherein the thickness of the

cm), and the gate electrode is 1,000 Å (10 cm) to 2,500Å (column 5, line 54) heat treating is repeated in a temperature range of 600<sup>0</sup>C to 720<sup>0</sup>C (column 6, line 59.

16. Pertaining to claim 8, Wieczorek teaches the method for manufacturing the semiconductor device according to claim 7, further comprising:

heat treating the substrate after the repeating step for 30 seconds at a temperature of about 850<sup>0</sup>C (column 7, lines 61-62).

17. Pertaining to claim 9, Wieczorek teaches the method for manufacturing the semiconductor device according to claim 8, wherein the conductive portion to which silicide is applied is an N-type semiconductor.

### ***Conclusion***

18. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

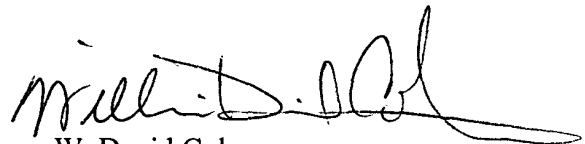
19. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 703-305-0004. The examiner can normally be reached on 9:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7721 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

A handwritten signature in black ink, appearing to read 'W. David Coleman', with a long horizontal flourish extending to the right.

W. David Coleman  
Examiner  
Art Unit 2823

WDC  
February 19, 2003